COROLLARY. Let $\alpha=\frac{1}{2}\pi$; then $\Delta=\dfrac{b^2}{2\pi}$, the same as problem 26.

[NOTE.—By mistake in numbering the problems in this department, number 28 was omitted. The above problem and solution are inserted that problems be numbered consecutively. EDITOR.]

29. Proposed by JOHN DOLMAN, Jr., Philadelphia, Pennsylvania.

Neglecting perturbations, what is the average distance of the earth from the sun ?

Solution by WILLIAM HOOVER, A. M., Ph. D., Professor of Mathematics and Astronomy, Ohio University, Athens, Ohio.

The focus being the pole, the polar equation to the ellipse is

$$r=\frac{a(1-e^2)}{1-e\cos\theta}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1).$$

I. The radii vectores being drawn at equal angular intervals,

$$m'=\frac{\int r d\theta}{\int d\theta}=a(1-e^2)\frac{\int_0^\pi \frac{d\theta}{1-e\cos\theta}}{\int_0^\pi d\theta}=a\sqrt{1-e^2}=b.$$

II. If x be the abscissa of any point on the curve, the focal distance is

$$r=a-ex\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2),$$

$$\text{and } m''=\frac{\int_{-a}^{+a}(a-ex)dx}{\int_{-a}^{+a}dx}=a,$$

the points on the curve being so taken that their abscissas increase uniformly.

III. If the number of radii vectores depends upon the length of the curve,

$$m'''=\frac{\int r ds}{\int ds},$$

ds being an element of the curve.

Also solved as I. above by *Profs. F. P. MATZ*, and *O. W. ANTHONY*, and as III. by *Prof. G. B. M. ZERR*.

PROBLEMS.

37. Proposed by HENRY HEATON, M. Sc., Atlantic, Iowa.

Required the average area of all triangles two of whose sides are a and b.